

# LESSON 71

LAB

## Some Things Never Change Conservation of Mass

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

### Purpose

To explore changes in mass that may occur during chemical or physical changes.

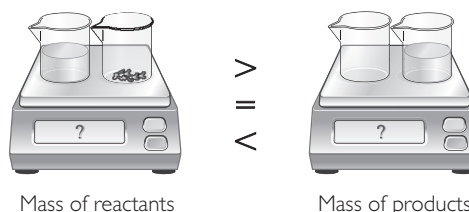
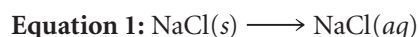
### Materials

- balance
- transparent plastic cups (6)
- water
- NaCl(s), 1 g
- 1.0 M Na<sub>2</sub>CO<sub>3</sub>(aq), 40 mL
- 1.0 M CaCl<sub>2</sub>(aq), 20 mL
- acetic acid, C<sub>2</sub>H<sub>4</sub>O<sub>2</sub>, 20 mL
- graduated cylinder

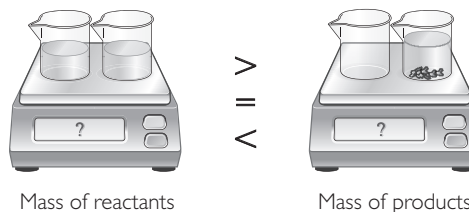
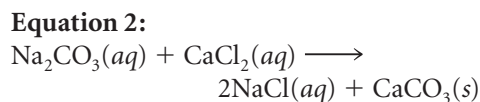
### Part I: Predict the Mass

For each equation, predict whether the reactant or the products will have greater mass by circling >, =, or <. Write an explanation and try to convince your group.

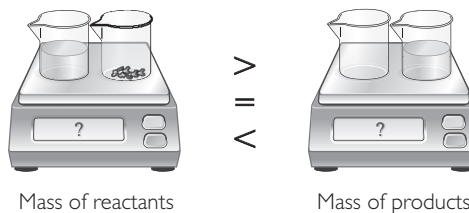
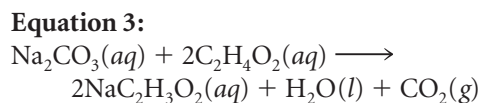
- Water is added to solid sodium chloride to produce aqueous sodium chloride.



- Aqueous sodium carbonate is added to aqueous calcium chloride to produce aqueous sodium chloride and solid calcium carbonate.



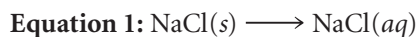
- Aqueous sodium carbonate is added to aqueous acetic acid to produce aqueous sodium acetate, water, and carbon dioxide gas.



## Part 2: Testing Your Predictions

Carry out each of the three changes described. Find the total mass before and after each change. Measure to the nearest tenth of a gram.

1. Put approximately 1 g of  $\text{NaCl}(s)$  in one cup. Put 20 mL of water in another cup.



Reactants	Chemical name	Description	Total mass before mixing
$\text{NaCl}(s)$			
$\text{H}_2\text{O}(l)$			

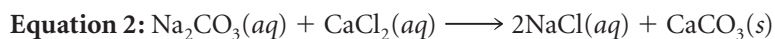
2. Combine the reactants.

Products	Chemical name	Description	Total mass after mixing
$\text{NaCl}(aq)$			

3. Explain your observations. Do they match your predictions?

4. Why do you think water is not included as part of the chemical equation?

5. Put 20 mL of 1.0 M  $\text{Na}_2\text{CO}_3(aq)$  in one cup. Put 20 mL of 1.0 M  $\text{CaCl}_2$  in another cup.



Reactants	Chemical name	Description	Total mass before mixing
$\text{Na}_2\text{CO}_3(aq)$			
$\text{CaCl}_2(aq)$			

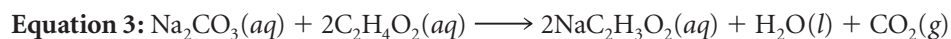
6. Combine the reactants.

Products	Chemical name	Description	Total mass after mixing
$\text{CaCO}_3(s)$			
$\text{NaCl}(aq)$			

7. Explain your observations. Do they match your predictions?

8. Look at the chemical equation representing this change.
- What is the solid that formed?
  - What is dissolved in the solution?
  - Did the number of atoms change between reactants and products?

9. Put 20 mL of 1.0 M  $\text{Na}_2\text{CO}_3(aq)$  in one cup. Put 20 mL of  $\text{C}_2\text{H}_4\text{O}_2(aq)$  in the other cup.



Reactant	Chemical name	Description	Total mass before mixing
$\text{Na}_2\text{CO}_3(aq)$			
$\text{C}_2\text{H}_4\text{O}_2(aq)$			

10. Combine the reactants.

Products	Chemical name	Description	Total mass after mixing
$\text{NaC}_2\text{H}_3\text{O}_2(aq)$			
$\text{CO}_2(g)$			

11. Explain your observations. Do they match your predictions?

12. Why do you think water is included as part of the chemical equation?

13. **Making Sense** Mass is conserved during physical and chemical changes. Explain what this means.